ARRI

ALICE
COLOR MANAGEMENT

Instruction Manual
As of: April 2003

Contents

Safety Instructions

⚠️ *Caution:*
This manual is an addendum to the existing ARRILASER instruction manual.
Please make sure to read the ARRILASER manual prior to continuing with this manual!

1 ALICE
ARRILASER Interactive Configuration Editor

The ALICE offers the fastest, easiest and safest way to generate a new image processing configuration file and gives visual control over the whole image process from the raw input sequence to the final images positioned on the film. General input parameters like start/end frame, calibration and loader-LUT can also be specified and will be transferred to the GUI input window when quitting and saving the ALICE window. Furthermore additional information is provided about the input images such as image type, pixel size and bit depth. Analyzing and controlling tools further simplify the configuration process.

The purpose of ALICE is
- to judge the quality of the input images
- to select the frame range visually
- to build a job and select appropriate job settings with visual control of the final rendered images positioned on the film.
- By choosing an ICC profile for the workstation monitor, the effect on the actual output on film can be previewed. This is especially helpful in transferring colors that lie outside of the normally reproduced color space of the choosen film. All results can be accurately previewed.

ALICE uses the same image processing as the image processing used during recording. Therefore, the results of image processing operations previewed in ALICE are completely identical to those being recorded later. Zooming in and out is always done by replicating or omitting pixels to exclude all possibility of inaccuracy of the displayed image.

viewer area

film view

processed view

original view

timeline

ALICE - R:/tfe/CMMPeterNAB2002/in_CircleUngraded/in_CircleUngraded_%05d.tif

File About

Original Processed Film

projectable area

pixel info

display settings

home button

configuration area

Projectable Area
1 : 1.78
Projector Mask
Save Title Area
Sound Track
Image Bar

Pixel Info
x: 1277 y: 442
G 79
R 149
B 50

Display Settings
Fit
x: 0 y: 0
w: 1920 h: 1080
View cineon
proof

Input Format:
HDTV 1080
1920x1080:8 1.78
Start   End
0   898

Output Format:
1 : 1.78
HDAcad1.77
1920 x 1080
11.425 µ

Calibration:
carlos_2k_0926
intermed positiv
Loader:
8to10

Crop Area: X   Y
Position 0   0
Size   1920 1080
Aspect 1.78
lock aspect

Deinterlace
off

Sharpen
off
Filter Strength

CMS
Monitor:
off
Printfilm:

2 Operation

To start ALICE click the ALICE Button beneath the image processing configuration list in the input tab of ALGUI. Any preselected image processing file will be applied in ALICE, as long as it is compatible with ALICE's configuration. If not, or if no file is selected at all, ALICE will be opened with default settings. Geometry, loader LUT and calibration can be preselected before opening the ALICE window or inside the ALICE window. If a chosen setting is not compatible with the ALICE configuration default values will come up.

The ALICE window is separated into the viewer area and the configuration area ⇨ **photo**.

2.1 Viewer area

The viewer area includes the viewer window, timeline, projectable area, pixel info and display settings. It offers a visual control of the raw input sequence and is used to create interactively the configuration parameters. A preview shows the actual position of the final images on the film.

- The '**original**' view shows the original raw input images.

- The '**processed**' view accurately displays the effects of the chosen filter and geometry settings (output format, crop area, deinterlace, sharpen and CMS, if activated).

- The '**film**' view shows the processed images positioned on the film for final control.

- The '**timeline**' is simply a display of a frame range. By default it is the length of the clip or sequence. It does not limit or control the actual start/end parameters saved in the jobscript.

Timeline

- To change the displayed frame range, enter the start/end frame in the corresponding text field at the beginning and end of the timeline ⇨ **photo**.

  The '**cur**' field shows ⇨ **photo** the actual displayed frame number. Typing a particular number in that field will show this frame on the display.

  The '**inc**' value ⇨ **photo** indicates the step width for moving through the timeline using the arrow keys on your keyboard. To skip frames, change the '**inc**'-value numerically or by choosing the predefined values in the drop down list.

- To reset the displayed frame range click on the home button ⬚ at the right end of the timeline. This will refresh the images and reset the frame range.

- Additional keyboard shortcuts can be used.
  Arrow left/right:
  retreat/advance a step based on the frame increment setting.
  Page up/down:
  retreat/advance by approx. a tenth of the timeline range.
  CTRL + arrow up/down:
  double/half the increment value.

Projectable Area

- By choosing an output format in the '**projectable area**' ⇨ **photo**, internally the corresponding 'projector mask' is selected. The 'projector mask', the 'save title area' or both together can be activated. Additionally the reserved region for the soundtrack and the frame line can be displayed.

Note: The areas are only seen in the film view and have no effect on the processed images!

Pixel Info

- With the mouse pointer you can pinpoint the RGB code values (CV). The x/y position is shown in the upper left corner of the '**pixel info**' ⇨ **photo** section.

Note: In the 'original' view the original CVs from the input images (8, 10, 12 or 16 bit) are displayed. In the 'processed' view 16 bit RGB values are shown, because internally all image processing is done in 16 bit. The 'film' view shows the 10 bit cineon CV as they are sent to the recorder. Those values will change by changing the loader LUT.

Display Settings

- Choose a zoom factor from the drop down list in the '**display settings**' area ⇨ **photo** to zoom in/out (25% - 200%) or use the right mouse button or keyboard shortcuts.
Right mouse button:
zoom in/out, fit, 100% (the mouse pointer must be positioned in the viewer window!)
**Keyboard shortcuts**:
ctrl –/+ (numerical keypad), ctrl F (Fit), ctrl 0 (100%)

Beneath the zoom factor drop down list the information about the position of the upper left image corner (X,Y) and the size (width, height) of the displayed image part is shown ⇨ **photo**   .

While the image is usually displayed as a linear image (exception: Cineon files), the ´**view cineon**´ button will display the image in cineon logarithmic space, as they will be transferred to the recorder. In that mode the influence of changing the loader LUTs can be seen. The ´**view cineon**´ button is only activated in the film view.

To judge the influence of the Color Management, use the '**proof**' and the ´**gamut**´ button (see *chapter 5*).
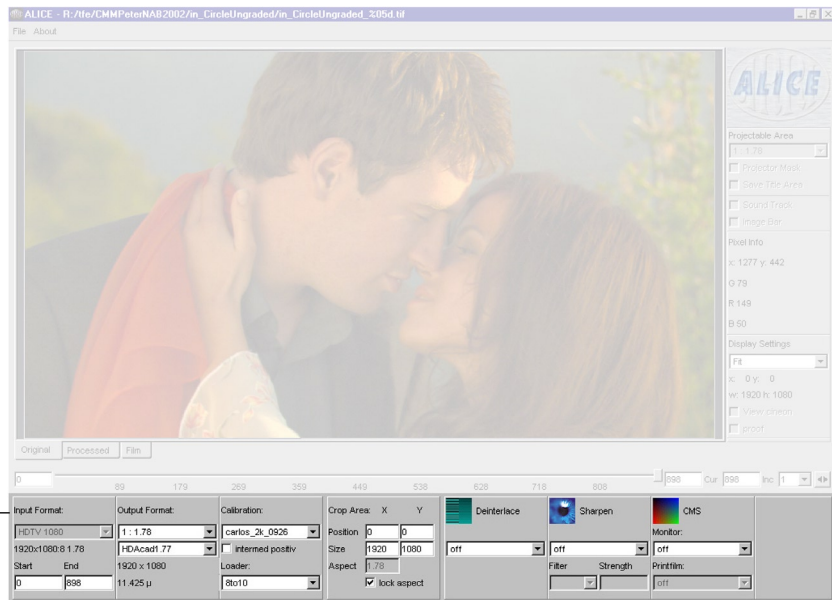
input format

ouput format   calibration   crop area

CMS

Sharpen

Deinterlace

2.2 Configuration Area

This chapter explains all available ALICE nodes and their parameters in a systematic way according to the standard GUI configuration. It is mainly intended as a reference.

In this window a configuration file for the image processing can be build.

Note: This configuration file works only together with the chosen geometry.

See *chapter 5.5, Image Processing* of the ARRILASER Manual, for a detailed description of the image processing function.

Input Format

- In the '**input format**' section ⇨ **photo** the size, bit depth and pixel aspect ratio of the selected sequence are displayed.
  By default images of the size 1920x1080 are automatically recognized as HDTV 1080 (pixel aspect 1.0), of 1280x720 as HDTV 1280 (pixel aspect 1.0), of 720x486 as NTSC (pixel aspect 0.9385), and images of the size 720x576 are recognized as either PAL (pixel aspect 1.067) or PAL Plus (pixel aspect 1.416).

  ⚠️ *The right choice for PAL or PAL Plus must be selected by the user*

  All other formats are taken as generic and a pixel aspect of 1 is assumed. For modifying this default selection please refer to *chapter 4.*

  Start and end frame for the selected sequences are taken from the ALGUI window.

- To change the recordable frame range, enter the start/ end frame in the corresponding text fields ⇨ **photo**.

Output Format

- The determination of the '**output format**' ⇨ **photo** is a two-stage selection procedure:

  First the desired projection aspect ratio must be choosen (i.e.: 1:2,35 CS means squeezed for projection with cinemascope lenses).

  All available geometries for this aspect ratio will appear in the second drop down list. The pixel resolution and the pitch size provides additional information about the chosen output geometry.

  A crop box with the appropriate aspect ratio will appear on the display. Geometries which are not available in the list can be generated in the ALGUI geometry setup as described in *chapter 5.2.2.2* of the ARRILASER manual. Restarting the ALICE software will place those new geometries in the list.

Note: Changing the '**output format**' will reset the crop area to the maximum appropriate settings to fit into the new '**output format**'.

Calibration

- Select the actual '**calibration**' ⇨ **photo** and '**loader LUT**' ⇨ **photo** for the used film stock and lab and the format conversion look-up-table (LUT).

  The LUT converts the given files into the Cineon format. Choose 10log, if the files are already in the Cineon format. Those settings are taken from the ALGUI input window; changes will be returned to the ALGUI input window.

- '**Intermed Positive**' ⇨ **photo**:
  Adds the necessary changes to the image processing config file for intermed positive recording.

  Necessary adjustments like flip the image, paste on black background and invert the loader LUT (interposlut) are automatically done. Results can be seen in the film view. No other adjustments need to be done for intermediate positive recording.

Crop Area

- With the crop node a '**crop area**' ⇨ **photo** can be specified by the x/y-size and the origin of the crop box in relation to the original image.

  By selecting a projection aspect ratio (e.g. 1.66) in the '**output format**' node the maximum appropriate '**crop area**' settings are adjusted automatically and, if necessary, the image is auto scaled to fit into the chosen '**output format**'.

  By default the x-size of the crop box is set to maximum input image width and the image height is selected according to the aspect ratio.
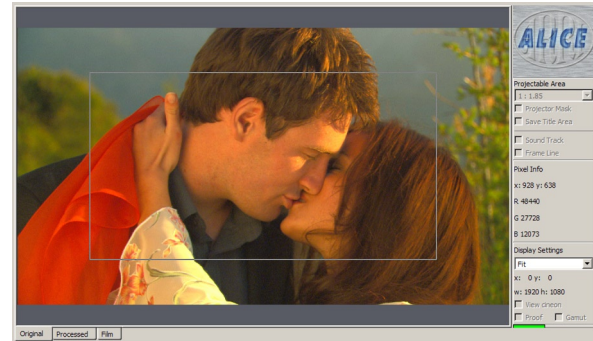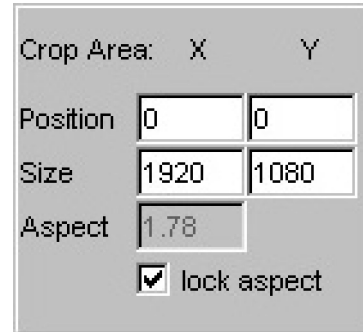
Crop box handling with the aspect locked:
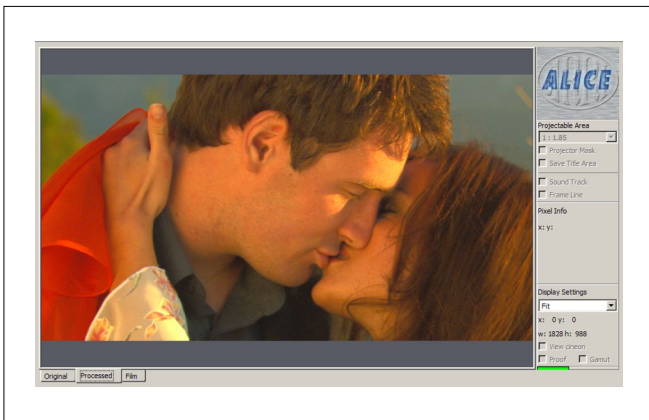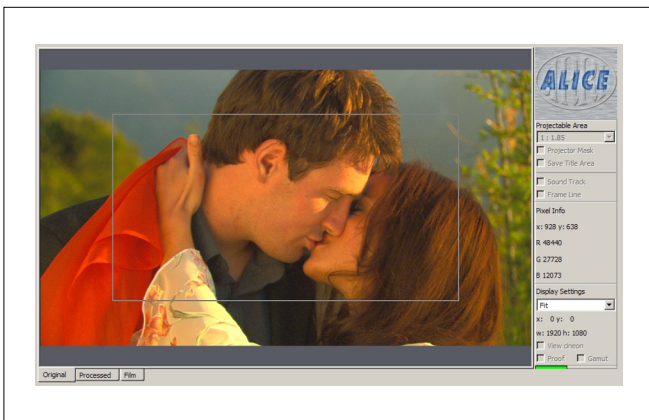
CTRL + drag the center -> move the crop box.

ALT + drag the border -> vary the size fixed to its center.

Drag a corner -> vary the size fixed to the opposite corner.

Drag a side -> vary the size fixed to the opposite side.

Crop box handling with the aspect unlocked:

If the image should not be cropped in order to get the selected output format the ´**lock aspect**´ button ⇨ **photo** can be switched off. This mode allows to only downsize the aspect ratio starting from the chosen ratio in the '**output format**' node. The result is a horizontally-centered image with a letterbox on both sides. Check in the film view for the look. The projectable image height remains constant according to the chosen projection aspect ratio.

To enlarge the aspect ratio (e.g. 1.66 to 1.85) means to decrease the projectable image height. To do so, change the projection aspect ratio in the output node!

Drag a side   -> vary the size fixed
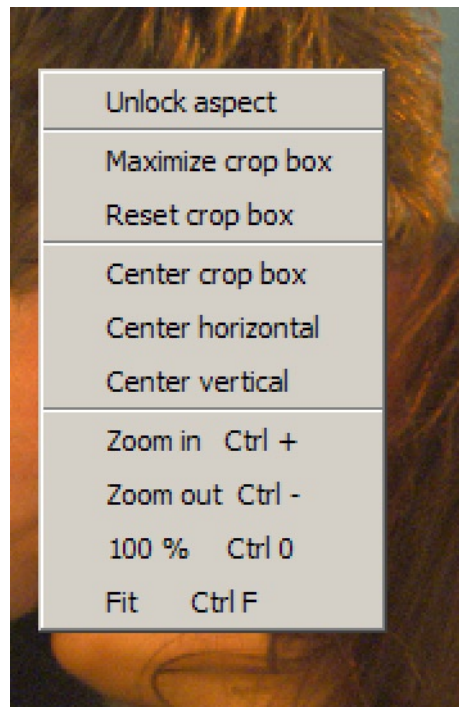   to the opposite side.

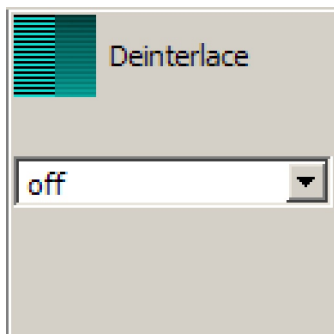**ALT + drag a side**   -> vary the size and aspect
                                        fixed to the center.

Right mouse button:

To reset the crop box to its default, to maximize or center the crop box use the right mouse button, when the mouse is located in the image area.
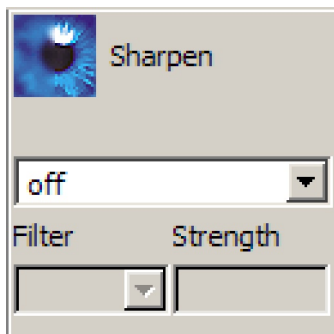
Deinterlace

The '**deinterlace**' ⇨ **photo** node enables the merging of two fields of video originated frames. There are no arguments required.

- For quick comparison between '**deinterlace**' on/off toggle key D in the processed view mode. Pushing down the key will disable the effect on the image and the color of the icon will change to black & white. For 'effect on' release the key.

Sharpen

The '**sharpen**' node ⇨ **photo** applies a sharpening process on the image. The details of the sharpening process are determined either by choosing a predefined kernel file and following the description of the convolution node (see *chapter 5.5.2.4* of the ARRILASER manual), or by choosing variable and using the unsharp masking as described in chapter *4 of the Release Notes CLIF 3.5/ALGUI 3.44*. In this case a filter size and strength must be choosen. Filter strength is set in percentage and can be varied from 0 to 200. To judge the sharpening effect set the display settings to 100%. For quick comparison between sharpen on/off toggle key S in the processed view mode.

CMS

The Color Management system ('**CMS**' ➪ **photo**) node is used to apply high quality profiles for standard devices such as Sony HD Monitor and Kodak Vision print stock projected by a xenon lamp in order to bring the colors of the film output close to what can be seen on the monitor.

- In the '**CMS**' node a monitor profile (M) and a print film profile (P) is selected.

For images with high saturated colors the soft clip can be adjusted by choosing one of the prepared soft clip settings from the list. See chapter 5 *Color Management for Video look f*or more detailed information on the Color Management. To judge the CMS settings switch the proof button on. For quick comparison between CMS on/off toggle key C.

Note: This node is key protected and only available, when the Color Management option has been purchased.

Note: The toggle on/off feature for 'Deinterlace', 'Sharpen' and CMS only works in the processed view!
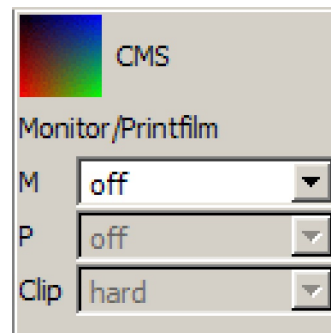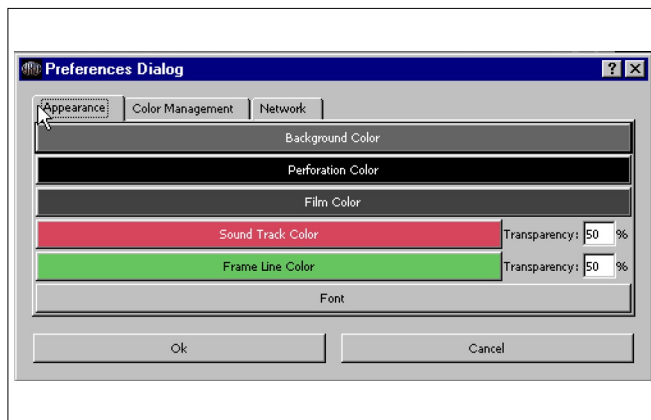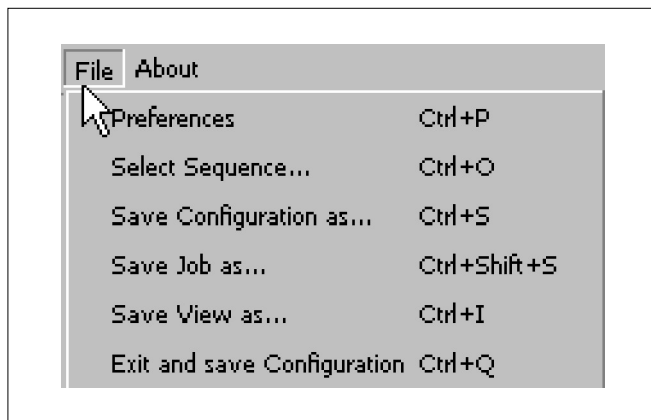
3 The File Menu

'**Preferences**' has three tabs:

- **Appearance**:
  to adjust the background, perforation, film, soundtrack and frame line color in the film view. Transparency of soundtrack and frame line can also be adjusted. The general ALICE font can be changed as well.

- **Color Management**:
  The profile for your workstation monitor can be selected here. It is necessary to make a selection in order to use the ´proof´ button. Settings for the out-of-gamut display can also be modified in this dialog (see chapter *Color Management for Video look* for more detailed information).

- **Network**:
  Available DVS hard disk recorders as well as appropriate network timeouts can be determined in this dialog (see chapter *4.4 Accessing DVS Disk Recorders* for more detailed information).

- '**Select sequence**':
  The file browser opens and the sequence can be
  selected in the display. This change will also be
  returned to the ALGUI, if ALICE is left with saving.

- '**Save configuration as…**'
  will open the file menu. The actual image processing
  configuration can be saved without leaving ALICE.

- '**Save job as…**' will save the actual job (including all
  settings from the ALGUI) without leaving ALICE. You
  will first be asked to save the image processing
  configuration file for that new job and then be
  prompted to save the job.

- '**Save view as…**'
  is used to save the current view as a
  - JPEG-image (8bit uncompressed or compressed)
    with overlays, if activated or a
  - TIFF-image (8 or 16 bit) without overlays.

  Overlays are the 'projector mask' and the 'save title
  area'.

Note: JPEG image saves the view as displayed, with
a size according to the present magnification
factor.
TIFF images are always saved in the true image
size, regardless of the magnification factor.
They also preserve the internal data range
used, so images with bit depth less than 16
will appear dim as TIFF files.

- Choose **'Exit and save configuration'**
  or close the ALICE window with the X
  to save the image processing configuration file and
  exit ALICE.

4 Configuration

4.1 Naming Conventions in ALICE

On startup, ALICE analyzes all configuration files, directories and environment variables relevant for recording. In addition to the information stored in the files, there are some conventions for naming files. These are relevant for ALICE only:

Cinemascope geometries

Geometry files with "CS" (in capital letters) in their file name are assumed to define cinemascope geometries, thus causing the recorded image to be warped for anamorphic projection.

Example:

```
Format:    CS_2K1828x1556
xSize:     1828
ySize:     1556
xOffset:   220
yOffset:   0
xOrigin:   1797
yOrigin:   2514
pitch:     1200.0
pullDown:  18960
```

Inter Positive fullap geometries

Geometry files named 'ipfullap*.cfg' are used as fullap geometries for intermed positive recording. For each supported pitch there must be one (and not more than one) ip fullap geometry file. ALICE is installed with ip fullap geometries for all supported pitches.

Example:

```
Format:    2Kipfullap
xSize:     2048
ySize:     1583
xOffset:   0
yOffset:   0
xOrigin:   1797
yOrigin:   2352
pitch:     1200.0
pullDown:  18960
```

Loader LUTs for Color Management
(see also chapter 5)

Loader LUTs are used to convert images to cineon code values prior to recording. Since the cineon conversion is built in the ICC profiles used for the Color Management, Color Management will fail if incorrect loader LUTs are selected. Therefore, ALICE automatically selects the appropriate loader LUT if Color Management is turned on. They are distinguished from other loader LUTs by starting their name with CMS. If there is more than one CMS LUT for a bit depth, the user can choose between these LUTs, but will be prevented from selecting other LUTs. ALICE is installed with CMS loader LUTs for each bit depth, named cms08.lut, cms10.lut, cms12.lut and cms16.lut.

Note: Do not change the loader LUT in the ALGUI, if Color Management is selected.

4.2 Input Format File Specification

Location of input format file

The fully qualified path and filename of the input format file is specified in the environment variable ALICE_INPUT_FORMAT_FILE.
The suggested location is
'c:\al\alice\config\aliceInputFormats.cfg'.

Syntax of input format file

The syntax of the input format configuration file follows the general syntax of ARRILASER configuration files, as for example the film format file. Each entry defines a valid input format that is a pixel aspect (pixel width/pixel height) associated with an image size. Whenever images of this size are selected, ALICE displays a choice of pixel aspects, denoted by names, in the "Input Format" drop down list. Instead of giving image width of height in pixels, the keyword "any" denotes any arbitrary width or height. Definitions using the keyword "other" are selectable if (and only if) no other entry matches the current image size.

```
##################################################
# ARRILASER ALICE Input Format Configuration File #
#                ARRI Film & TV                   #
##################################################


# examples of entries for images scanned from
# cinemascope film, thus having a pixel aspect
# of 1:2 :
imageformat: 2k_cinemascope
     xSize      : 2048
     ySize      : 1556
     pixelAspect : 0.5


imageformat: generic_cinemascope
     xSize      : any
     ySize      : any
     pixelAspect : 0.5


# PAL size image, but with square
# pixels
imageformat: PAL_square
     xSize      : 720
     ySize      : 576
   pixelAspect: 1.0
```

ALICE uses the following internal rules to determine the list of input formats:

It internally maintains a list of input formats, consisting of the entries of the user defined file followed by predefined HD and SD formats. For any given input image, each format matching the size of the image is displayed in the input format panel. If no format is found in both the user defined and the internal list, a generic format with pixel aspect 1.0 is assumed.

4.3 Fine-tuning ALICE

Memory Footprint

The amount of memory ALICE consumes depends on the maximum image size to be processed, and the maximum size of its internal image cache.

The image cache limit can be influenced by the environment variable ALICE_MEM_FRACTION.
Its value is the percentage of the memory marked available to the application by the operating system. Default is 0.25, meaning that a quarter of the memory is the upper limit of the image cache. Note that this is the image cache only, not the total memory footprint of the application. The environment variable can be set in `c:\cshell\login.csh`.

Multi Threading

Besides running parallel to image loading and recording, the image processing can operate multi-threaded to make optimal use of the dual CPU system.

When running ALICE at the same time as recording on the same host computer, multi-threading can be switched off by setting ALIP_THREADS to 0.

This affects both ALICE as well as image processing for recording. Setting ALIP_THREADS to 1 turns on multi-threading, while setting it to "auto" causes the multi threading to be turned on, but to be disabled it temporarily if both ALICE and aldaemon are running at the same time, to allow interactive working with ALICE while computing data-intensive recordings. The auto setting is also the default if the environment variable is not set. The environment variable can be set in `c:\cshell\login.csh`.

4.4 Accessing DVS Disk Recorders

Together with ALICE comes the possibility to directly access DVS HDTV and SDTV disc recorders. Direct access to disc recorders is also possible via the command line interface (CLIF).

The direct frame access uses the DVS API, and does not need the DVS virtual file system to be installed. Frames are accessed as raw YUV data, and converted to RGB by the ARRILASER software. The conversion follows the DVS SMPTE274cgr matrices, thus converting the video save range into full 16 bit range.

Since the conversion is done at a very early processing stage, the images are seen by the ARRILASER software as 16 bit RGB images. They also require 16 bit LUTs for recording, regardless of being stored as 8 or 10 bit YUV on the disc recorder. Also, YUV data exported from the disc recorder as YUV16 can be read, if given the file extension '.yuv16'.

4.4.1 Browsing Disc Recorders

To make disc recorders visible in the sequence dialog panels, define their host names or ip addresses in the 'preferred disc recorders' section within the 'network' tab in ALICE preferences. The entry is a comma separated list of the disk recorders. Disk recorders can be specified by ip addresses or by name. If specifying names, make sure there is a domain name server entry for the disc recorders, or list them in the windows host file 'c:\winnt\system32\drivers\etc\hosts'.
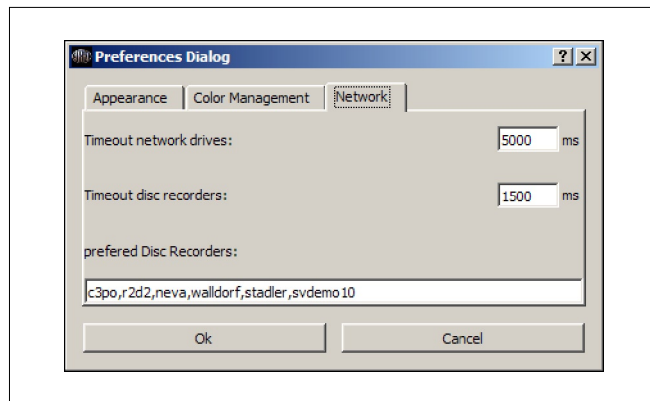
4.4.2 Network Timeouts

Whenever browsing file servers or disc recorders with the 'Open Sequence' dialog in ALICE, or the 'Browse" dialog in the ALGUI, waiting for inactive servers can be annoying. Therefore timeouts can be adjusted in the network tab ⇨ **photo** of the preferences panel of ALICE.

When accessing a DVS disc recorder, the check if the recorder is reachable is done by sending a ping request to its host. A value of 0 disables checking, connections to unreachable disc recorders will then timeout by the DVS defaults.

The timeout is ignored whenever loading images from the disc recorder, both by ALICE and CLIF. Therefore, it does not affect recording.

4.4.3 Partition Change Policy

On DVS disc recorders, frames of different sizes are stored in different partitions. Only one partition can be active at a time, and only frames on active partitions can be accessed.

Since changing the active partition will prevent all other applications and real time operations to be stopped, the ARRILASER software can be allowed or forbidden to automatically switch to the partition it needs.

If the environment variable AL_DR_PARTITION_CHANGE is set to 1, both CLIF and ALICE will switch partitions without notice. If unset or set to 0, CLIF will never change partitions, while ALICE will ask the user. The environment variable can be set in `'c:\cshell\login.csh'`.

4.4.4 Command Line Interface Syntax

Frames on a disc recorder can be accessed by the alexpose command as files, using the protocol-like filename convention:
`'dr://<host name>/<partition name>/<clip name>/<frame number>'`

e.g.

`'dr://mydiscrecorder/PART1/testclip/42'`

means frame 42 within the clip testclip. Frame enumerations starts with frame 0.

Omitting the clip name addresses the complete partition, e.g.
`'dr://mydiscrecorder/PART1/500'`

Note: This is a name convention built in the CLIF and ALGUI software, not a protocol. Therefore, no extra drives have to be installed to use this feature.
Although the DVS software allows the creation of partition and clip names containing '/' or '\', these will not work. The reserved clip name '.' (a single dot) shall also be avoided.

5 Color Management for Video Look

5.1 Operation from ALICE

5.1.1 Configuration of CMS node in ALICE

- Choose monitor profile '**sony_hd**' from the list beside M

- Choose print film profile vision from the list beside P

- Choose soft clip parameter from the list beside clip

If you have your own ICC profiles, copy them into the folder 'c:\al\ipconfig\icc'. After restarting ALICE they will appear in the profile selection list beside M and P.
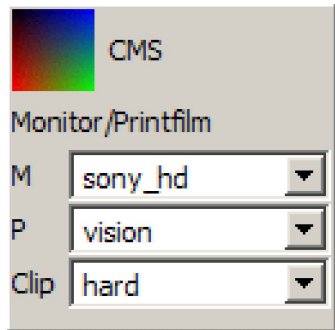
5.1.2 Soft clip Parameter

As the color gamuts of film and monitor are different, not all colors that are visible on the monitor can be reproduced on film. In order not to lose too much detail in those areas, it is required that either the lightness or the chromaticity of these areas is reduced.

In the list of soft clips a preselection of recommended soft clips can be found. As using a soft clip will not only affect the out-of-gamut colors, but also the colors that are just within the gamut, the lowest possible soft clip should be taken.

The strength of the softclip is dictated by the out-of-gamut colors in the sequence to record. For judging the softclip, use the proof and the gamut function in the process view (see 5.1.3).

Display Settings

Fit ▼

x: 0 y: 0

w: 1920 h: 1080

☐ View cineon

☑ Proof   ☑ Gamut
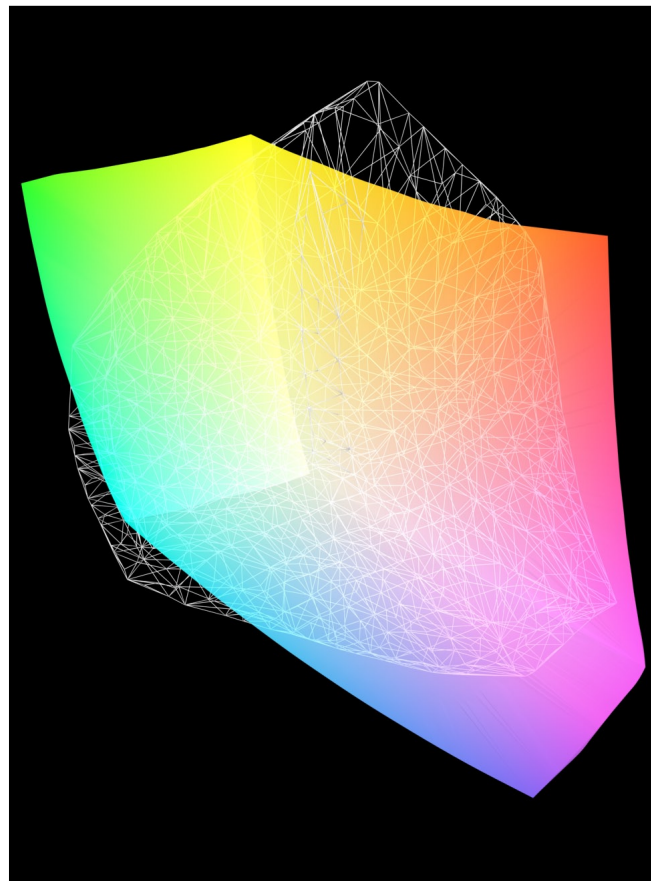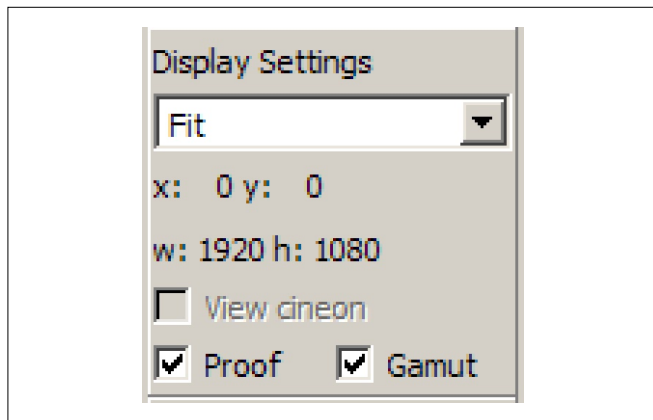
5.1.3 Display settings

Proof:
Since the color profiles directly generate cineon data, judging the effect of the Color Management on the screen can be difficult. Therefore, the proof mode allows for simulating the appearance of the recorded image on the workstation monitor.

• To use the proof-mode, an ICC profile for the monitor has to be selected in preferences.

Note: It is also handy to select the HDTV monitor as workstation monitor, regardless of the fact that it is not a HD monitor, since this display allows checking the effect of clipping out-of-gamut colors easily by using the 'C' toggle key.

• Go to file-preferences-Color Management. Choose workstation profile: '**sony_hd.icm**'.

There it can be judged, if the loss of resolution in those areas is acceptable, or not. If not, a soft clip can be applied. Using a soft clip, it is recognizable, that more colors are different to the original, but at the same time more detail can be achieved in back.

Gamut:
The out-of-gamut colors can also be indicated separately, if the gamut box is tocked. This will highlight the areas which are out-of-gamut.

⚠ *Be aware that in these areas clipping can occur.*

These areas can be reduced by changing the soft clip parameters. The way of highlighting can be modified in the preferences-Color Management dialog. There the color

in which those areas are indicated can be choosen (preferable a color which is not so present in the images) and how to show the distance of those colors to the gamut.

fixed color:
All out-of-gamut pixels are drawn with the out-of-gamut color selected in preferences.

blend to fix color:
The color of all out-of-gamut pixels is smoothly blended with the out-of-gamut color selected in preferences. The mixing ratio depends on the distance of the color to the gamut, so that colors being far outside the film gamut finally are displayed in the out-of-gamut color only.

color distance mask:
In gamut pixels are displayed as gray, while out-of-gamut pixels are blended between the gray and the original color. The more saturated a color appears in this view, the more it is out-of-gamut. Note that since the blending is done between the gray and the original color, turning proof on has no effect herewith.
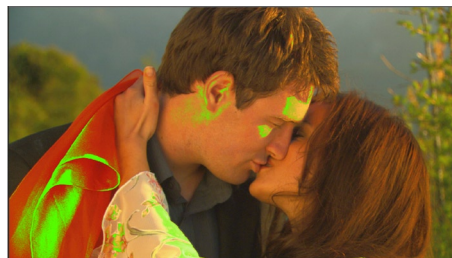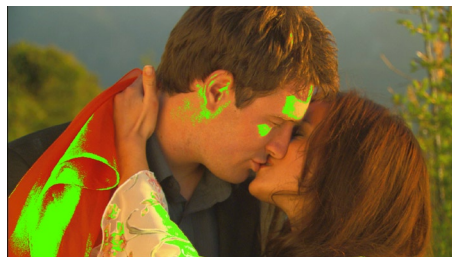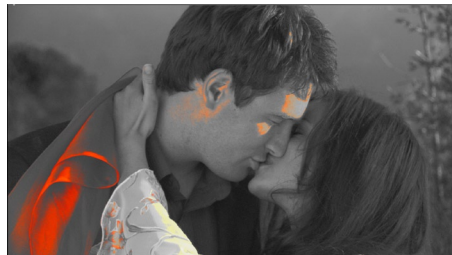
5.2 Configuration

5.2.1 *Monitor Setup*

Calibration of the HD class A reference monitor

The HD Monitor that has been used for the color timing shall be calibrated according to the following guidelines:
- The color temperature shall be 6500K

- 100% white shall be at a luminance of 80 cd/m^2.

- 20% gray shall be at a luminance of 2.2 cd/m^2

The following two test images are needed for the calibration procedure:

calibration image	luminance	Y	U	V
20% gray	2.2 cd/ m^2	240	512	512
100% white	80 cd/m^2	940	512	512

Note: We recommend the use of a high quality color calibration sensor, e.g. a Philips PM 5639.

5.2.2 *Film Setup*

The vision print film profile is established under the following circumstances:

- Recorded on Kodak 5242 intermediate film stock

- Recorder calibrated to carlos.aim

- Printed on Kodak Vision print stock

- LAD frame (Aqua 0015) printed to 1.09 1.06 1.03 densities

5.2.3 Color Management Node

The Color Management node is part of the ARRILASER image processing system. It allows the use of all features of the Color Management through its scripting interface. Please refer to chapter 5.5, *Image Processing Software Engine* of the ARRILASER manual for detailed description of the image processing itself.

The CMS node syntax

The CMS node creates a 3D lookup table from the ICC profile specified as monitor and recorder profile. The monitor profile is taken as input profile, the recorder profile as output profile.

An optional gamut compression can be activated by specifying one of the presets defined in the soft clip configuration file.

Also, the rendering intent can be influenced by specifying either 'absolute', 'relative', 'perceptual' or 'saturation'. For a detailed explanation of rendering intents refer to the ICC home page www.color.org. The only intent supported by ALICE is 'absolute'.

Node type identifier and node arguments

The Color Management node is identified by the keyword 'CMS'.

Argument	Type	Default	Description
monitor profile	string	-	ICC profile to be used as monitor profile
recorder profile	string	-	ICC profile to be used as recorder profile
soft clip	string	-	soft clip parameters to be used (optional)
intent	string	-	rendering intent to be used (optional)

Example:

```
# example configuration file showing
# the use of the Color Management node
# with default settings, as used in ALICE

node: CMS
    monitorprofile: hdmonitor.icm
    recorderprofile: arrilaser.icm

# example configuration file showing
# the use of the Color Management node
# with soft clip

node: CMS
    monitorprofile: hdmonitor.icm
    recorderprofile: arrilaser.icm
    soft clip: weak
```

5.2.4 Soft clip Configuration File

Colors outside the recorder gamut cannot be recorded without changes, since they do not exist on film. By default, these colors are hard clipped into the recorder gamut. To smoothly clip these colors, a compression of the monitor gamut has to be done. The strength of the compression can be controlled by the parameters given in the soft clip configuration file. This chapter explains the syntax and use of this file.

Location of soft clip configuration file

The fully qualified path and filename of the soft clip configuration file has to be specified in the environment variable ALIP_SOFTCLIP_FILE (set under 'c:\cshell\login.csh'), and consistently in the ALGUI startup file 'Arri.txt'. The default location is 'c:\al\ipconfig\icc\alsoftclip.cfg'.

Syntax of soft clip configuration file

The syntax of the soft clip configuration file follows the general syntax of ARRILASER configuration files, as for example the film format file.

```
#################################################
#               ARRI Film & TV                  #
#################################################

# example of an entry using the same settings
# for all colors
softclip: all_the_same
    dL: 25%
    dC: 25%


# example of color specific entry
softclip: different
    dL: 25%
    dC: 25%
    dC.R 10%
    dL.M 10%
```

For each entry in the soft clip configuration file, the following parameters are valid:

soft clip	name of the setting, used as value of soft clip parameter of the CMS node. Example: "mysoftclip".
DL	luminance difference, used for each color if not specified color specific
dC	chroma difference, used for each color if not specified color specific
dL.R	luminance difference for red
dL.G	luminance difference for green
dL.B	luminance difference for blue
dL.C	luminance difference for cyan
dL.M	luminance difference for magenta
dL.Y	luminance difference for yellow
dC.R	chroma difference for red
dC.G	chroma difference for green
dC.B	chroma difference for blue
dC.C	chroma difference for cyan
dC.M	chroma difference for magenta
dC.Y	chroma difference for yellow

The color specific settings (dL.R , etc.) always take precedence over the color independent setting (dL), regardless of the order of the arguments. This means, there is no difference in specifying e.g. dL.R before or after dL .

Soft clip parameters demystified

Gamut compression can be achieved in general by reducing the chroma of colors, thus moving colors slightly towards the gray axis.

In the case of recording CRT monitor images to film, due to the fact that film gamut reaches its maximum chroma at lower levels of lightness than the monitor gamut, carefully reducing lightness also moves colors into the film gamut.

Best results are achieved by balancing chroma and lightness reduction. The soft clip parameters specify the amount of change in terms of the perceptual difference between the two gamut's, e.g. setting dC.R to 50% reduces red chroma by 50% of the difference between the pure red of the monitor and film gamut, respectively.

Both chroma and lightness change depending on hue, chroma and lightness, so that dark and unsaturated colors are affected less than bright, highly saturated colors. For colors at which the film chroma is greater than the monitor chroma, the chroma difference should be 0 or negative to gain gamut compression, otherwise gamut extension would be the effect. This is especially true for yellow.

5.3 Provided profiles

Provided with the color management are the following ICC profiles:

profile name:
sony_hd.icm
description:
Sony BVM –D24 class A HDTV studio monitor, HDTV video safe range
device dependent RGB values:
16 bit RGB values,
representing the SMPTE260M video safe YUV range.
That means:
RGB=0 matches YUV=64,512,512 and
RGB=65535 matches YUV=940,512,512
for 10bit YUV.

profile name:
vision.icm
description:
Kodak Vision print stock projected by a xenon lamp

technical data are subject to change without notice

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available languages:
English

ARRI ⟨ARRI⟩ ARNOLD & RICHTER CINETECHNIK